THE JOURNAL OF
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

(Including Transactions)

Volume 36 MARCH 1914 Number 3

CONTENTS

SOCIETY AFFAIRS

The Spring Meeting (III). Considerations Affecting the Publication of Transactions (IV). Council Notes (V). Degree Conferred upon Professor Sweet (IV). Association of Technical Secretaries (IV). Prizes for Technical Papers (VI). Two Important Reports (VI). John Fritz Medal (VI). Correspondence Statistics (VI). Year Book (VII). Local Meetings (VII). Ninetieth Anniversary of Rensselaer Polytechnic Institute (VII) International Engineering Congress (VIII). Applications for Membership (VIII). United Engineering Society: Report of Treasurer (X).

TRANSACTIONS SECTION

	PAGE
Comparative Tests of Three Types of Bearings, Carl C. Thomas, E. R. Maurer, L. E. A. Kelso	89
Discussion: E. H. Ahara, William Kent, Selby Haar, The Author	95
Pitot Tubes for Gas Measurement, W. C. Rowse	97
Discussion: D. S. Jacobus, W. H. Carrier, Karl Nibecker, C. C. Thomas, Leo Loeb, F. R. Still, G. F. Gebhardt, C. P. Crissey, A. G. Christie, The Author	99
Gears for Machine-Tool Drives, John Parker	104
Discussion: John Riddell, F. V. McMullin, A. L. DeLeeuw, H. F. L. Orcutt, A. W. Thompson, E. H. Neff, F. DeR. Furman, C. R. Gabriel, The Author	105
Cast Iron for Machine-Tool Parts, Henry M. Wood	107
Discussion: W. Wallace McKaig, A. Lewis Jenkins, Thomas D. West, Forrest R. Jones, E. H. Mumford, Bradley Stoughton, A. L. DeLeeuw, D. J. Riggs	109
A Record of Pressed Fits, C. F. MacGill	112
Discussion: John E. Sweet, Sanford A. Moss, Harry M. Lane, John Riddell, A. B. Carhart, The Author	114
Standardizing Machinery, Fred H. Colvin	115
Discussion: Luther D. Burlingame, F. DeR. Furman, A. B. Carhart, Fred J. Miller, The Author	116
Necrology	126
Meetings	127

REVIEW SECTION

	PAGE
Foreign Review and Review of the Proceedings of Engineering Societies	049

SOCIETY AND LIBRARY AFFAIRS

	PAGE
Personals	LI
Student Branches	LI
Employment Bulletin	LII
Accessions to the Library	LV
Heating Costs	LVII
Sun Motors	LVIII
Officers and Committees	LIX

PUBLISHED MONTHLY BY

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

29 West Thirty-ninth Street, New York

PRICE 35 CENTS A COPY, $3.00 A YEAR; TO MEMBERS AND AFFILIATES, 25 CENTS A COPY, $2.00 A YEAR. POSTAGE TO CANADA, 50 CENTS ADDITIONAL; TO FOREIGN COUNTRIES, $1.00 ADDITIONAL

Entered as second-class matter, January 4, 1912, at the Postoffice, New York, N. Y., under the act of March 3, 1879

COMING MEETINGS

March 4, *Boston, Mass.*, Boston City Club. Annual Joint Dinner, under the auspices of the American Institute of Electrical Engineers. Addresses: The National Government and Business, by Guy E. Tripp of the Westinghouse Electric & Manufacturing Company; Results for the Electrical Engineering Fraternity accomplished by the I. E. C., by A. E. Kennelly, professor of electrical engineering, Harvard University; Ozone applied to Ventilation, by M. W. Franklin of the Sprague Electric Works, Bloomfield, N. J.

March 10, *New York City*, Engineering Societies Building. Subject, Color Photography: its Processes and Results. Papers by F. E. Ives, originator of the tripak and trichrome system of color photography; Westley Allison, representing the Lumiere Jougla process; John Powrie, originator of the Warner-Powrie process. Discussion by Henry Hess of Philadelphia and C. W. Robinson of New York, followed by an open debate.

March 11, *Boston, Mass.*, Wentworth Institute. Papers on Welding by W. N. Best and representatives of the Thompson Electric Welding, Cave Welding, and Goldschmidt-Thermit Companies. A buffet supper will precede the meeting.

March 12, *Buffalo, N. Y.*, University Club. Address: Safety Appliances in Industrial Plants, by John Price Jackson.

March 14, *Philadelphia, Pa.* Paper: The Development of the Steam Plant of the Modern Electricity Supply Station, by I. E. Moultrop.

THE JOURNAL OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

(Including Transactions)

Volume 36 MARCH 1914 Number 3

THE SPRING MEETING

The Society is fortunate in its choice of location for the Spring Meeting, which is to be held in St. Paul-Minneapolis on June 16 to 19. St. Paul, with its picturesque location and historic interest, is a most attractive convention city. It is built on a series of hills, the main business portion being situated on a great plateau just above the edge of the Mississippi, while on a hill rising gradually from the river bank stands the beautiful Minnesota State Capitol. The parks scattered over the entire city are a source of unending delight; one of these, Indian Mounds Park, the burying ground of an unknown prehistoric race, lies on the high bluffs overlooking the Mississippi just where the river takes a sweeping bend to the south.

Minneapolis, although an Indian reservation only a little over half a century ago, has now a population of 335,000 inhabitants, and has become the great manufacturing center of the Northwest, as well as one of the most beautiful cities in the country. It owes its beginning to the Falls of St. Anthony, which furnished power for the sawmills to reduce the surrounding forests to lumber. This cleared country was sown to wheat and the Falls turned the millstones which ground it to flour. In this district today are to be found the world's greatest flour mills with a daily capacity of 84,000 barrels, and two of the largest grain elevators in the world.

As last year, there will be three main professional sessions, one on Grain Handling and Ore Handling, a topic to be discussed by local engineers, but of very general interest; the second on Powdered Fuel, which will be treated under four heads: powdered fuel in open-hearth furnaces, in cement kilns, for the generation of steam, and for industrial furnaces; the third session will be devoted to miscellaneous papers, and these are earnestly solicited, especially when giving the results of the individual work of members. Supplementing these three main sessions, it is probable that there will be others arranged by sub-committees.

Among important reports to come up at the Spring Meeting for discussion will be the preliminary report of the Committee to Formulate Standard Specifications for the Construction of Steam Boilers and other Pressure Vessels and for Care of Same in Service, and that of the Committee on Flanges, the latter of which was presented for preliminary discussion at the last Annual Meeting.

TENTATIVE PROGRAM

As at present arranged, the program is as follows: On the two opening days the meetings will be held in St. Paul, beginning with a reception on the evening of June 16. Mr. James Hartness, President of the Society, will make introductory remarks, which will be followed by a message to the engineering fraternity by Mr. James J. Hill, former president of the Great Northern System. Dancing will conclude the evening.

Wednesday morning, June 17, will open with a business meeting, to be followed by a professional session. The ladies will be shown about the city and will be entertained at luncheon. The afternoon will be devoted to a second professional session.

The Thursday morning session will be held in Minneapolis in the buildings of the University of Minnesota. A representative of the University will make the opening address, and luncheon will be served. During the morning the ladies will be shown about the city in automobiles. In the afternoon the members of the Society and their guests will be entertained by Mr. Gebhard Bohn at his beautiful home on Lake Minnetonka. Supper will be served and dancing will follow.

Friday will be devoted to technical excursions. There is a prospect of a trip to Duluth, in which case it is recommended that the party leave at 2.30 p.m., arriving in Duluth at 7.00 p.m., where a reception will be tendered by the local members of the Society. An opportunity will be given next day to inspect the Duluth harbor with all its engineering features. It is hoped that boat connections will be such that members from the East may return by way of the Lakes.

A further suggestion is a trip to Keokuk to inspect the great water power plant on the Mississippi River.

CONSIDERATIONS AFFECTING THE PUBLICATION OF TRANSACTIONS

In the January issue of The Journal was an explanation of the plans, formulated by the Publication Committee and approved by the Council, for the development of The Journal, in which the proposal was made to include Transactions in The Journal, thereby avoiding the expensive and wasteful duplication which has resulted from the publication of matter first in The Journal and later in the annual volume of Transactions. Supplementing this, a statement is here given of the main considerations involved in this change.

At the outset it should be said that the publication plans have been so formulated that there will be ample opportunity to give them a thorough trial, and so determine their adaptability to the needs of the Society by actual experience. The volume of Transactions for 1913 will be issued as usual the coming summer and even if no action in the matter is taken until a year from the present date, a volume for 1914 can be published, if so ordered by the Council.

Five years ago the only meetings besides the sessions at the Annual and Spring Meetings were occasional meetings in New York. At that time it was possible to include in one annual volume of Transactions practically all the material presented before the Society. Since that time, however, there have been two important developments in the meetings of the Society, besides other activities, which have made a revision of the whole publication plan seem desirable.

Local meetings have been organized in twelve cities and last year forty such meetings were held. At many of these monthly meetings papers are contributed which are worthy of a place in the Society's publications. Almost none of these papers, however, can be published in Transactions because of the necessity for keeping within the limits of a single volume annually, the cost of a two-volume edition being prohibitive.

The other development has been the professional committees appointed by the Committee on Meetings. The need for these was made evident by an analysis of the papers contained in recent volumes of our Transactions which showed that certain subjects had received disproportionate attention, that others had been treated inadequately, and still others entirely neglected. Out of 685 papers, 71 were devoted to steam engines, while 82 subjects that were regarded as important in present-day engineering had not been discussed at all. Men of authority in these subjects were accordingly appointed to arrange meetings dealing with important phases of mechanical engineering not previously treated.

The result of this movement has been to broaden the interest in the Society and to increase the number of sessions and the number of papers presented, with corresponding benefit to the membership. It has added, however, to the publication problem, so that it has not only been necessary to omit reports of monthly meetings from Transactions, but to condense and even to omit some papers given at the Annual and Spring Meetings.

Another serious problem in this connection is the handling of the reports issued by the special committees of the Society. There are fifteen of these committees and their reports will constitute a large volume of material.

Members who are not in touch with this situation probably do not realize how much the developments mentioned enhance the value of the Society's publications when conducted in an economical and effective manner. For example, the Committee on Railroads has within a year held three sessions, at a single one of which fifteen papers were presented on the subject of Steel Cars, and at another one of which there was a comprehensive paper on Air Brakes, containing 200 pages. A short time ago the Boston Section held a convention at Worcester, at which several papers were given, and the New Haven Section holds quarterly meetings at each of which several papers are read. Simultaneous sessions at the Annual Meeting with more papers and more discussion are the regular thing; the local committee at San Francisco devotes its meetings to engineering practice on the Pacific slope; the committee at St. Paul and Minneapolis is now arranging for papers on engineering in the Northwest; the professional committees contribute their quota; and there are already in hand for publication two voluminous reports of 250 pages each, prepared respectively by the committees on Power Tests and Boiler Specifications. These instances are cited and many others could be given to show the broad scope of the matter now contributed to the Society and the large amount of material to be handled.

The Publication Committee, therefore, have had to determine how best to place at the disposal of the membership the vast quantity of material coming from these various sources. Transactions, as has been stated, has reached the point where the expense of its production in anything like complete form is prohibitive. The publication and distribution of papers in Transactions after they have appeared in The Journal is wasteful and uneconomic. Further, practice in the mechanic arts now changes with so much greater rapidity than at the time when this Society was founded that the value of papers and discussion is very much less by the time a member receives them in the volume of Transactions than it was at the time of their presentation. The value to the members of a separate volume of Transactions may also be questioned, and each member can answer this for himself by considering to what extent he consults his bound volumes or whether he is inclined to relegate them to an unused section of his bookcase.

Such considerations as the foregoing led the Pub-

lication Committee to make the following recommendations, which conform with the practice of an overwhelming majority of the societies of the world, in the following extract from their report for 1913, published in the December Journal:

The Committee believes that under present conditions the monthly publication of a great engineering society should be of much broader scope and that the reports of meetings and accounts of Society affairs in general should become the predominating features. The papers should be published in the numbers following a meeting, instead of in advance, enabling the papers and discussion to be brought together in the form of reports, and presented in the same manner in which any technical journal would deal with the affairs of the day. Under such an arrangement of papers and discussion not only would the value of The Journal to the membership be enhanced, but the arrangement would be such that it could take the place of Transactions.

In regard to the latter, the arguments in favor of issuing The Journal in such form that it will itself consist of the Transactions, thus making unnecessary the duplicate publication of part of the matter appearing in The Journal, are as follows:

1 The declining value to the average member of the Society of such a publication as Transactions, which at best covers but a narrow part of the broad expanse of the full activity of the Society, as compared with the increasing value of such a publication as The Journal, which besides doing just what the Transactions does, also covers every other activity of the Society.

2 The increasing cost of Transactions, due to the increase in editorial work necessary to reduce to the limits of one volume the large number of papers now being read all over the United States in the various branches of the Society as well as at the Annual Meetings. Should the alternative be adopted, namely of a two-volume edition, the cost would then be prohibitive.

3 The advantage to the membership of having these funds available for other and more useful purposes.

4 The elimination of the economic waste now incurred by publishing in two places the papers presented before the Society, a practice which has never been indulged in by the great European societies, and which is customary with only three other American societies.

It will be observed that what has been done is to arrange the matter in The Journal so that the papers and discussion will be brought together instead of being published in separate issues as heretofore. When published in this way they constitute the Transactions of the Society brought to the attention of the membershhip from month to month when the material is yet new and timely, instead of a year after it has been presented. With The Journal made to include the Transactions, it will become more valuable to the membership than were formerly The Journal and Transactions together, and the money saved by this arrangement can be put to much more useful purpose than in a duplicate publication of the papers and discussion presented at the meetings. The goal is greater efficiency, greater usefulness and better service.

COUNCIL NOTES

The members are invited to participate in the subscriptions now being made for a memorial to Sir William H. White, and a committee consisting of Jesse M. Smith, Chairman, F. R. Hutton, and Alex. C. Humphreys, was appointed at the meeting of the Council on February 13 to have charge of the matter. Sir William, who was an Honorary Member of the Society, was known personally to many of the membership.

The following committees were approved in local centers: Buffalo, W. H. Carrier, Chairman, Jas. W. Gibney, S. B. Daugherty, C. A. Booth, C. H. Bierbaum; Milwaukee, E. P. Worden, Chairman, F. H. Dorner, Secretary, Henry Weickel, H. Greger, L. P. C. Smith, H. V. Conrad; St. Louis, F. E. Bausch, Chairman, E. L. Ohle, Secretary, L. Nordmeyer, H. W. Hibbard, John Hunter; and in New York, John P. Neff in place of F. A. Waldron, whose term has expired.

CALVIN W. RICE, *Secretary.*

PROFESSOR SWEET GIVEN DEGREE

It is a pleasure to record, as has been done in the personal column in this issue, the conferring of the degree of Doctor of Engineering by Syracuse University on Prof. John E. Sweet, one of those most instrumental in the founding of the Society.

Engineers have felt it an honor, whenever there was an opportunity, to express to Professor Sweet their appreciation of his long life of service, and this opportunity has now come to the University. The degree was conferred on Professor Sweet at his office in the works of the Straight Line Engine Company, where he was sought out by the representatives of the trustees and faculty of Syracuse University. The presentation was made by Dean Wm. P. Graham, who spoke of the notable services which Professor Sweet has rendered to the engineering profession and of the inestimable value of his friendly council to students, inventors, experimenters, and others seeking to gain recognition in various departments of mechanical activity. Professor Sweet responded characteristically, saying that it seemed as though his friends had been honoring him all his life.

ASSOCIATION OF TECHNICAL SECRETARIES

The Secretary of the Society attended a preliminary conference on February 7 of the secretaries of railroad and technical societies, and it is expected that there will shortly be issued a call for the secretaries of the principal technical societies to form an association which will serve principally as a clearing house for the dates of meetings and conventions, thus avoiding conflicts. It is possible also that this organization will secure other mutually helpful features.

PRIZES FOR TECHNICAL PAPERS

The Society is fortunate in having received from Mr. Henry Hess, member of the Council, an endowment of $2000, the income from which is to be used for prizes for technical papers from Junior and Student members. The awarding of prizes to young men rising in their profession has been recognized by many foreign societies as an incentive for the attainment of distinction, though to a less extent in this country, except in educational institutions.

Mr. Hess has conferred a great favor upon the Society by initiating a movement of this kind and by placing the funds in the hands of the Society without restrictions. The following resolutions were passed by the Council in acknowledgment of this generous gift:

Whereas, the Council of The American Society of Mechanical Engineers has heard with deepest appreciation the announcement of the gift to the Society from Mr. Henry Hess to establish two prizes for the best technical paper in any year in each of two classes in the membership, and

Whereas, the Council accepts these gifts with thanks and covenants to see that the generous and wise purposes of the donor shall be carried out,

Resolved, that a copy of this minute of appreciation and acceptance be engrossed and signed by the President and Secretary of the Society and transmitted to Mr. Hess, and

Resolved, that the Committee on Meetings be requested to confer with Mr. Hess as to the details of the competition, the standard of excellence and originality to be maintained and other features of the prize papers and to report their recommendations to the Council.

TWO IMPORTANT REPORTS

Two reports, involving many months of investigation and labor on the part of the committees of the Society having them in preparation, are now ready for the printer and will be ready for distribution within a few weeks.

These are the reports of the Committee on Power Tests and of the Committee to Formulate Standard Specifications for the Construction of Steam Boilers and Other Pressure Vessels and for the Care of Same in Practice. Each of the reports is voluminous and represents a large expenditure of time and painstaking effort, as well as the best thought of many engineers who are specialists upon the subjects involved.

The Power Test report, which contains rules for conducting performance tests of power plant apparatus, was published in preliminary form in The Journal, and brought up for discussion at the Annual Meeting of 1912. It has since been revised and to a considerable extent rewritten as the result of many helpful suggestions and criticisms offered by members of the Society, and is now ready to be printed in its final form and presented to the Council for approval.

The report of the Committee on Boiler Specifications is still in its preliminary state and a limited edition will be printed for immediate distribution. Copies will be sent to a selected list of engineers and their comments invited, so that the Committee may have before them the opinions of these men before putting their report into its permanent shape. It is expected that this report will be used in many States as a basis for model laws for licensing engineers and firemen and for boiler inspection, including rules for construction, installation and operation, based upon the most approved practice of the present time.

JOHN FRITZ MEDAL

At a meeting of the Board of Directors of the John Fritz Medal Fund Corporation, a minute of appreciation on the completion of Mr. Fritz's long and useful life of effective service to his profession and his country was placed on record, in which the influence of his achievements and character upon the duty of awarding the medal was emphasized. The recipient of the medal must have done something of value such as would commend itself to the clear-headed judgment and the kindly approval of the big heart of the man in whose honor the Board acted.

The wish and ambition of the Board of Award was further expressed that at no time should the award fall below the standard set in the lifetime of Mr. Fritz as respects the character of the men to whom the medal is to pass.

CORRESPONDENCE STATISTICS

One measure of the broad field covered by the Society's activities is the amount of mail received and sent out in the conduct of its work. The following statement of mail, express and freight received at and dispatched from its headquarters during the calendar year 1913 is of interest in this connection:

Incoming matter included 58,110 letters, 5400 packages and 3420 books and periodicals.

Outgoing matter included 113,287 letters, 53,607 circulars, 75,196 copies of The Journal, 4860 copies of Transactions, 6761 copies of the Year Book, 10,600 of the Geographical Lists of members, 11,500 copies of Condensed Catalogues, 3650 copies of professional papers, 393 miscellaneous volumes, and 5325 miscellaneous packages; a total of 285,179 separate pieces.

This statement does not include the very large volume of correspondence, notices, etc., received and dispatched by local sections, student branches, committees and officers of the Society directly from their own offices. Generous recognition should here be given to the many officers and members of committees who not only give largely of their time, but also substantial contributions of postage and stationery, clerical and stenographic services, traveling and office expenses. Although the Society maintains a large staff and spent during the last fiscal year nearly $120,000 in the ad-

ministration of its service to the membership and the profession, it could not possibly have covered so wide a sphere of work without this generous assistance from individuals and companies and the active participation of committees.

The statistics quoted give some conception, although not an adequate one, of the manner in which the Society keeps in touch with its members, sister societies, the diversified industries included in the field of engineering, as well as officials of city, state and nation, nor are these activities confined to the United States.

They reflect, moreover, the rapid development of the profession, in keeping with the industrial expansion of the country, and also to a large degree the increasing participation of the engineer in public affairs.

YEAR BOOK FOR 1914

The 1914 issue of the Year Book is now ready for distribution and will shortly be in the hands of the membership. It contains the names and connections of the 5394 members of the Society, arranged both alphabetically and according to geographical location. The volume contains also, as usual, a list of the officers and committees of the Society, some general information about the Engineering Societies Building and Library, the Constitution and By-Laws, and several other matters of like value to the membership at large.

Each member is entitled to receive free of charge a cloth bound copy of the Year Book, and if he desires additional copies may secure them at a cost of fifty cents apiece. Non-members may purchase copies at one dollar apiece.

LOCAL MEETINGS

It was not until the spring of 1909, when meetings of the Society were organized in St. Louis and Boston, that any local meetings were regularly held except at the Society's headquarters in New York. The remarkable growth in this direction during the past five years will be evident by noting the brief reports of meetings in this issue of The Journal and announcements of those to come. There were ten of these meetings reported, with a gratifying attendance. At Chicago a meeting and banquet were held, attended by 140; there were 100 in attendance at the Cincinnati meeting; 80 at San Francisco; and 40 at a St. Paul-Minneapolis meeting. In the matter of attendance the Boston Section has probably on the average had more engineers present than any other city. The quarterly meetings at New Haven have had a large attendance, that at the last one exceeding 250.

In stating the above only the figures at hand have been quoted to indicate the interest displayed at the various centers. Undoubtedly the attendance in other cities, as at St. Louis, may considerably exceed some of the figures mentioned. In most of these cities an effort has been made to bring together the engineers of different organizations holding joint meetings under the plan, usually, of having some one society in charge. The scope of these meetings and the valuable accessions to the literature of the Society which come as a result of this growing activity is clearly indicated by the following list of papers taken from the reports and announcements in the present issue: Boiler Tests with Illinois Coal, by Bryant Bannister, presented at the Chicago meeting, January 28; Air Conditioning, by J. Irvine Lyle, presented at St. Louis, February 4, and also at Cincinnati on February 12; American Railroad Ditcher, presented by Oliver Crosby at St. Paul on January 7; Construction and Mechanical Details of the Minnesota State Prison at Stillwater, by C. L. Pillsbury, read at Minneapolis on February 11; Transportation of Crude Oil in Pipe Lines, a symposium given at San Francisco on February 10; Business Training for Engineers, Dr. Alex. C. Humphreys and T. L. Jones, given at Philadelphia on February 9; Railroad Rolling Stock, Electrical Equipment and Permanent Way, symposium at Boston, February 4; Brake Performance on Modern Steam Railroad Passenger Trains, by S. W. Dudley, presented at New York, February 10; Color Photography, its Processes and Results, to be given at New York on March 10; Symposium on Welding, to be given at the Boston meeting of March 11; the Development of the Steam Plant of the Modern Electricity Supply Station, by I. E. Moultrop, announced for Philadelphia, March 14; and Safety Appliances in Industrial Plants, by John Price Jackson, Buffalo, March 12.

NINETIETH ANNIVERSARY OF RENSSELAER POLYTECHNIC INSTITUTE

Rensselaer Polytechnic Institute, the oldest technical college in America, celebrated its ninetieth anniversary on February 6, at a dinner at the Hotel Biltmore, New York, at which occasion was also taken to pay a tribute to the engineering profession. About 600 engineers, including members of the national engineering societies and the alumni of the various technical institutions of the country were present. Mr. Nelson P. Lewis of the Class of '79, engineer of the Board of Apportionment of New York, acted as toastmaster, and stated the conception of the occasion, drawing attention to the fact that the guests of honor were those representative of the engineering profession,—the presidents and secretaries of the five national engineering societies, and others prominent in the profession, including Alfred Craven, engineer of the public service commission of New York and its highest paid official; Elmer E. Corthell, prominent for work in connection with the jetties made at the mouth of the Mississippi under the direction of Mr. Eads, and for other remarkable harbor and river work in Central and South America; Richard C. Hollyday, representing the United States Navy;

Alex. C. Humphreys, Past-President of this Society and President of Stevens Institute of Technology; Robert W. Hunt, Past-President of this Society and prominent as a pioneer in the Bessemer steel industry of this country, and Alfred Noble, member of our Council, past-president of the American Society of Civil Engineers and Honorary Member of the Institution of Civil Engineers, and formerly a member of the Isthmian Canal Commission.

The principal address of the evening was given by Howard Elliott, chairman of the New York, New Haven and Hartford Railroad Company, which was a masterful tribute to the engineering profession. The other speakers were the Hon. Edward E. McCall, chairman of the Public Service Commission, Samuel Insull, president of the Commonwealth Edison Company of Chicago, Arthur B. Leach, banker and financial agent for many power development companies, Jean L. de Pulligny, director of the French Government commission of engineers to the United States, which is in the nature of a post-graduate course of instruction through travel for engineer graduates of French universities, and Palmer C. Ricketts, president of Rensselaer.

The whole occasion was one long to be remembered as in every way contributing to the encouragement of the engineer and the drawing of public attention to his responsibilities in all public affairs. Much of the credit for the success of the evening is due to Edwin N. Sanderson of the Class of '86, Chairman of the dinner committee.

INTERNATIONAL ENGINEERING CONGRESS

According to the latest report of the Committee of Management for the International Engineering Congress, to be held in San Francisco in 1915 under the auspices of the five national engineering societies, the official invitation to participate in the Congress has been accepted by 173 societies in all parts of the world, and many others yet to be heard from will doubtless send delegates. The Congress will thus offer an exceptional opportunity to all who attend to meet the leading engineers of this country and of other nations, and should be one of the most representative gatherings of the engineering profession ever held in America.

The meetings of our Society abroad in 1910 and during the past summer impressed the membership particularly with two features—the solidarity of the engineering profession in Europe, and the important position held by engineers in public affairs. Such a Congress as that of 1915, held in conjunction with the celebration of the greatest engineering achievement of our country, should form the occasion of acquainting the public with the part of the engineer in the world's work.

As one of the five organizations under whose auspices the Congress is to be held, members of the Society have been asked to enroll as members of the Congress, and thus far 223 have responded. The American Society of Civil Engineers heads the list with an enrollment of 296, the American Institute of Electrical Engineers having 185, the American Institute of Mining Engineers 34 and the Society of Naval Architects and Marine Engineers 18. It is hoped that many more of our members will enroll at an early date, so that we may not fall behind the good proportion that is customary in an affair of such importance and opportunity.

At the last meeting of the Council it was formally voted to appoint a committee to consider and make comprehensive recommendations in regard to the entertainment of the foreign engineers who will attend, as the Society looks forward with much pleasure to renewing the friendships formed in the recent trips abroad.

APPLICATIONS FOR MEMBERSHIP

Members are requested to scrutinize with the utmost care the following list of candidates who have filed applications for membership in the Society. These are sub-divided according to the grades for which their age would qualify them and not with regard to professional qualifications, i. e., the age of those under the first heading would place them under either Member, Associate or Associate-Member, those in the next class under Associate-Member or Junior, while those in the third class are under twenty-five years of age and therefore qualified for Junior grade only. The Membership Committee and in turn the Council urge the members to assume their share of the responsibility of receiving these candidates into the membership by advising the Secretary promptly of any one whose eligibility for membership is in any way questioned. Members will be furnished with complete records of any candidate thus questioned. All correspondence in regard to such matters is strictly confidential and is solely for the good of the Society, which it is the duty of every member to promote. These candidates will be balloted upon by the Council unless objection is received before April 10, 1914.

FOR CONSIDERATION AS MEMBER, ASSOCIATE OR ASSOCIATE-MEMBER

ARMSTRONG, WM. H., Mgr., Pneumatic Tool Dept., Ingersoll-Rand Co., New York.

BENNETT, ROBERT G., Inspector, Test Dept., Penna. R. R., Altoona, Pa.

BILLOW, CLAYTON O., Cons. Engr., Secy. and Treas., National Supply Co., Chicago, Ill.

BLACK, WINFIELD S., M.M., American Sugar Refinery, Brooklyn, N. Y.

BOWEN, ALMON F., Mech. Engr, Glamorgan Pipe & Foundry Co., Lynchburg, Va.

BOYD, WILLARD A., Cons. Engr., 22 Pendleton Pl., New Brighton, N. Y.

BRETZFELDER, IRA L., Vice-Pres. and Treas., Alvey Mfg. Co., St. Louis, Mo.

BUEDINGER, OTTO, Water Filtration Expert, Birmingham, Ala.

BURNETT, R. W., Genl. M.C.B., Canadian Pacific Railway, Montreal, P. Q.

CADE, CHARLES W., Genl. Supt., The Crown Cork & Seal Co., Baltimore, Md.

CLARK, DAVID B., Engr., Railway Materials Co., Chicago, Ill.

CLIFFORD, ERNEST L., Engr. with William A. Pope, Contractor, Chicago, Ill.

COOK, ROBERTSON, Prof. Experimental Engrg., South Dakota State College, Brookings, S. D.

COPELAND, FREDERICK K., Pres., Sullivan Machinery Co., Chicago, Ill.

CRIQUI, ALBERT A., Htg., Vent. and Fan Engr., Buffalo Forge Co., Buffalo, N. Y.

CROMWELL, OLIVER C., Mech. Engr., The Baltimore & Ohio R.R. Co., Baltimore, Md.

DUNLOP, WILLIAM C., Asst. Elec. and Mech. Engr., Barclay, Parsons & Klapp, New York.

FLATEBOE, EINAR I., Ch. Engr., The Vulcan Iron Works, Seattle, Wash.

GILMORE, JOHN W., Vice-Pres. and Factory Mgr., Crouch & Fitzgerald Co., New York.

GRAFFAM, WALTER S., Instr., Smith's Agri. Sch. & Northampton Sch. of Industries, Northampton, Mass.

HARRIS, CARL C., Supt., Rodney Hunt Machine Co., Orange, Mass.

HASWELL, WM. E., Secy., Ohio Board of Administration, Columbus, O.

HATCH, HENRY J., Turbine Engr., General Elec. Co., Lynn, Mass.

HEARN, GEORGE, Pres., The Ricker Mfg. Co., Rochester, N. Y.

HENRY, ALEXANDER S., Vice-Pres., Railway Steel Spring Co., New York.

HINDMAN, WILBERT L., Rate Setter, Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

HOWARD, FRANK E., Secy. & Treas., James L. Howard & Co., Hartford, Conn.

HUGHES, RICHARD H., Vice-Pres. & Genl. Mgr., Crescent Portland Cement Co., Wampum, Pa.

JOHNSON, HENRY S., Babylon, L. I.

JONES, EDWARD A., Pres. and Treas., E. D. Jones & Sons Co., Pittsfield, Mass.

KELLER, ALBERT T., Mech. Engr., Indiana Steel Co., Chicago, Ill.

KELLY, ANDREW, Supt., Newark Stations, Public Service Elec. Co., Newark, N. J.

KING, EDWIN L., Receiver, The Pratt & Cady Co., Hartford, Conn.

LASHER, GEORGE W., Asst. Treas. & Mgr., Munson Bros. Co., Utica, N. Y.

MANSFIELD, JULIAN B., Ch. Engr., Vice-Pres. & Genl. Mgr., The J. E. Bolles Iron & Wire Wks., Inc., Detroit, Mich.

MAXFIELD, DANIEL E., Supt., Florence Iron Works, Florence, N. J.

MEHL, WALTER B., Pres., Mehl Machine Tool & Die Co., Garwood, N. J.

MERRIAN, PEARL E., M. M. Methuen Co., Methuen, Mass.

MORSS, EVERETT, Pres., Simplex Wire & Cable Co., Boston, Mass.

MORRELL, ALFRED M., Mgr., Drop Forging Dept. & Purchasing Agt., Spicer Mfg. Co., Plainfield, N. J.

NEELY, FRANK H., Factory Mgr. with Harry L. Schlesinger, Atlanta, Ga.

NEWBOLD, CHARLES E., Ch. Engr. and Factory Mgr., Havana Iron Wks., Krajewski-Pesant Corp., Talleres de Pesant, Regla, Havana, Cuba.

NICHOL, GEORGE A., JR., Eastern Asst. Mgr., H. W. Johns-Manville Co., New York.

OBERT, CASIN W., Pres., Atlantic Machine Co., Brooklyn, N. Y.

PRESS, WM. J., Mech. Engr., Natl. Transcontinental Rwy. of Canada, Ottawa, Canada.

RHYS, CYRIL O., Designer, The Diamond Match Co., Barberton, Ohio.

RICHARDSON, CLIFFORD T., Asst. Mgr., Constr. & Engrg. Dept., Swift & Co., Boston, Mass.

ROGERS, NATHAN S., Ch. Engr., Venice Power Station, Illinois Traction System, Venice, Ill.

RUEBEL, C. A. ERNST, Pres., Ruebel & Wells, Consulting Engineers Co., St. Louis, Mo.

SAWTELLE, EDMUND M., Cons. Engr., 5 Beekman St., New York.

SCHOOF, ARTHUR W., Asst. Supt., Wells Bros. Co., Greenfield, Mass.

SEED, CHARLES R., Supt. of Power, Worcester Elec. Light Co., Worcester, Mass.

SEIB, GEORGE A., Mech. Supt., Remington Typewriter Wks., Ilion, N. Y.

SMART, CHARLES E., Efficieney and Mech Engr., Greenfield Tap & Die Corp., Greenfield, Mass.

SPILSBURY, RAYMOND G., Engr. and Designer, John Robertson & Co., Brooklyn, N. Y.

SINSHEIMER, SIDNEY W., Vice-Pres. and Genl. Mgr., The Holley Sugar Co., Denver, Colo.

STONE, CHARLES A., Member of Firm, Stone & Webster, Boston, Mass.

STORRS, LUCIUS S., Pres., The Connecticut Co., New Haven, Conn.

SUTER, JOHN H., Ch. Mech. Engr., Doe Run Lead Co., Rivermines, Mo.

TEETSELL, HARRY F., Genl. Supt., The Waldorf Box Board Co., St. Paul, Minn.

TUTTLE, HENRY A., Ch. Engr., Evans Stamping & Plating Co., Taunton, Mass.

VAN ALSTYNE, DAVID, Pres., Quigley Furnace & Foundry Co., New York.

VAN BRUNT, JOHN, Genl. Mgr. and Ch. Engr., The American Stoker Co., New York.

VAN STONE, CHARLES, Vice-Pres., Lunsden & Van Stone Co., Boston, Mass.

VASSAR, HERVEY S., Laboratory Engr., Public Service Elec. Co., Newark, N. J.

VEDDER, JOHN N., Asst. Engr., Experiment Sta., Univ. of Ill., Urbana, Ill.

WEBSTER, GEORGE A., Supt., Star Brass Mfg. Co., Somerville, Mass.

WHARTON, JAMES R., Gas and Refrig. Engr., University of Missouri, Columbia, Mo.

WILSON, JACOB D., Pres. and Genl. Mgr., American Elevator Co., New York.

WILSON, JAMES W., Supt., Lawer Depts., National Wks., National Tube Co., McKeesport, Pa.

WILLIAMS, TRACY B., Mch. Tool Designer, The Winton Motor Car Co., Cleveland, Ohio.

ZIEGLER, LESLIE I., Mgr. Milling Mchy. Dept., Nordyke & Marmon Co., Indianapolis, Ind.

FOR CONSIDERATION AS ASSOCIATE-MEMBER OR JUNIOR

GIBERT, RALPH W., Salesman and Demonstrator, Cincinnati Milling Machine Co., Cincinnati, Ohio.

HALEY, HARRY S., Member of Firm, Leland & Haley, San Francisco, Cal.

HANEY, JILES W., Research Fellow, Engrg. Experiment Station, University of Missouri, Columbia, Mo.

HORTON, THEODORE A., Shop Supt., John T. Horton Co., New York.

SOMERVILLE, WILLIAM A. S., Engr., The B. F. Goodrich Co., Akron, Ohio

STRAUSS, WILLIAM O., Adv. Mgr., Engr., The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio.

WORKMAN, LEROY V., Steam Engrg. Dept., Cambria Steel Co., Johnstown, Pa.

WORTHINGTON, EDWARD H., Sales Engr., Power Specialty Co., Chicago, Ill.

FOR CONSIDERATION AS JUNIOR

ANDERSON, WM. E., Designer, Alberger Pump & Condenser Co., New York.

BANFIELD, STANLEY M., 6 Hackfeld Road, Worcester, Mass.

BARTON, CHARLES R., Asst. Mech. Engr., Compania Mexicana de Petroleo "El Aguila," S. A., Tampico, Mexico.

BEERBAUM, ARTHUR J., Draftsman, The Arnold Co., Chicago, Ill.
BURFORD, ROBERT A., JR., Salesman, Power Equipment Co., Boston, Mass.
DUNNING, DAVID T., Sales Engr., Albro Clem Elev. Co., Philadelphia, Pa.
FARMER, KENNETH V., Cadet Engr., United Gas Improvement Co., Philadelphia, Pa.
GILLAM, WILLIAM H., JR., Asst. to Genl. Mgr., James Boyd & Bros., Inc., Philadelphia, Pa.
HALSEY, WILLIAM D., Asst. Mech. Engr., The Sharpless Separator Co., West Chester, Pa.
HERRCKE, ERNEST A., Asst. Mgr., La Salle Machine & Tool Co., La Salle, Ill.
HUNTER, HERBERT C., Engr., Otis Elevator Co., Harrison, N. J.
LUKENS, WILLIAM P., Mechanic, Saxon Motor Car Co., Detroit, Mich.
MACDOWELL, FRANCIS M., Draftsman, Power Specialty Co., Dansville, N. Y.
ORDWAY, EARL P., Ch. Draftsman, Union Steam Pump Co., Battle Creek, Mich.
PFEIFFER, BERNARD V., Supt. of Mfg. and Distributing, Nashville Gas & Heating Co., Nashville, Tenn.
ROBINSON, ARTHUR S., Inspector, N. Y. Connecting R.R., Winfield, L. I., N. Y.
ROBINSON, PARKER M., Draftsman, Southern Pacific Co., New York.
SHILAND, FINLEY H., Engr., Chester Paper Co., Chester, Pa.
SNYDER, JAMES R., Cadet Engr., Cayadutta Generating Co., Fonda, N. Y.
WENTZELL, HORACE R., Ch. Tool Designer, Maxwell Motor Co., Detroit, Mich.
WOOD, ALAN A., Sales Engr., Builders Iron Fdry., Providence, R. I.

TRANSFER FROM ASSOCIATE

GIBSON, GEORGE H., Cons. Engr., Prop., George H. Gibson Co., New York.
JURGENSEN, JESS C., Genl. Supt., United Piece Dye Works, Lodi, N. J.

PROMOTION FROM JUNIOR

ASHLEY, EDWARD E., JR., Mech. Engr., Starrett & Van Vleck, New York.
CONLEE, GEORGE D., Supt., Chuctanunda Gas Light Co., Amsterdam, N. Y.
FESSENDEN, EDWIN A., Associate Prof. Mech. Engrg., University of Missouri, Columbia, Mo.
HOLLMANN, FREDERICK W., M.M., Maryland Steel Co., Sparrows Point, Md.
MACMASTER, RONALD K., Executive Dept., Am. Soc. M. E., New York.
MERRILL, ALBERT S., Asst. to Ch. Engr., Turner Construction Co., New York.

SUMMARY

New applications	101
Transfer from Associate	2
Promotion from Junior	6
Total	109

UNITED ENGINEERING SOCIETY

REPORT OF TREASURER

TO THE BOARD OF TRUSTEES

UNITED ENGINEERING SOCIETY

I beg to submit herewith the report of your Treasurer as of December 31, 1913.

FINANCES

The Balance Sheet submitted herewith shows the physical property of the United Engineering Society, over and above the value of the building and the equity in the land, to consist of building equipment of a value of $27,357.16, furniture and fixtures $5,795.46, and library books $329.07.

There was added to the furniture and fixtures account during the year 1913 an amount representing an expenditure of $390.96, the principal items of which are: Drapery and hangings, alcove room $150.66, asbestos booth for moving pictures $70, filing cabinet $50.70, and three perforated rubber mats $48. In accordance with a resolution of the Board of Trustees, 10 per cent depreciation was charged off this account for the year 1913.

The principal of the mortgage on the land held by Andrew Carnegie, Esq., amounting originally to $540,000, has been reduced by payments from the land and building funds of the Founder Societies to $88,000. Payment of $40,000 was made during the year by the American Institute of Mining Engineers.

The present balances due from the societies are as follows: American Institute of Electrical Engineers $54,000, and American Institute of Mining Engineers $34,000. The American Society of Mechanical Engineers has paid the full amount of its indebtedness.

The gross operating expenses for the year 1913 were $38,981.54 as compared with $47,602.71 for the preceding year, showing a decrease of $8,621.17. During the year 1913 there has been very little expenditure of an unusual nature. The following are the principal items:

Storm doors, ground floor	$220.00
4 metal doors, ground floor	200.00
Additions to heating and ventilating	250.00
2 bookshelf cases (reimbursed by A.I.E.E.)	930.00
Painting interior	239.45
Taking down partitions Room 703, refitting in Room 901	245.75
Removing partition 11th floor (reimbursed by A.S.M.E.)	64.78
500 copies of By-Laws	156.14

In accordance with a resolution of the Board at a meeting held on January 23, 1913, an appropriation of $5000 was made out of the surplus for the year 1912, and of this amount $4943.75 was invested in $5000 New York City 4¼ per cent Corporate Stock, repayable 1962 at 98-13/16 as an addition to the Contingency and Renewal Fund, as provided for in the Founders Agreement, bringing the amount of said Fund to $29,963.75.

The assessments paid for the year by the Founder Societies, each occupying an entire floor, were $3375, representing as last year a total expenditure by each Founder Society, including interest on its full principal of mortgage on land of $10,575, reduced in each case to the extent the Society may have paid off part

or all of its mortgage share. The Associate Societies are assessed approximately $10,000 for equivalent privileges, which shows that the Founder Societies still meet a little more than their proportion of the carrying charges for equivalent office space occupancy in the building.

BUILDING

Equipment. The Real Estate Equipment Account during the year 1913 has been increased to an extent of $732.44, expended mainly in changes to north side of foyer on ground floor, sliding doors to create new room and architects services in connection therewith, also bookstacks on the twelfth floor.

Office Occupancy. There was on January 1, 1913, no unoccupied floor space (devoted to office space) in the building. There are, however, two rooms on the twelfth floor used during the past year for storage purposes from which no income has been received. There are now sixteen associate societies occupying office space in the building.

Meetings or Lectures. The record of the number of times the rooms were used during 1913 for meetings or lectures (not for office occupancy) is:

Meeting Room	Number of Times Occupied		
	1912.	1913.	Change.
Auditorium, 3rd and 4th floors	46	69	23 more
No. 1 Assembly Room, 5th floor	39	56	17 more
2 Assembly Room, 5th floor	70	129	59 more
3 Assembly Room, 5th floor	33	101	68 more
5 Lecture Room, 6th floor	35	10*	25 less
8 Lecture Room, 6th floor	84	20*	64 less
Small Committee Room, 2nd floor	12	0*	12 less
Small Committee Room (off foyer) 1st floor	0	10	10 more
Assembly Room 1201, 12th floor	0	18	18 more
Total	319	413	94 more

* No. 5 and No. 8 Lecture Rooms are now occupied by the American Museum of Safety, and the Small Committee Room on the second floor used as a storage space by the National Electric Light Association. Room No. 1201 was occupied last year by the Efficiency Society.

During the year 1913 the facilities of the building were enjoyed by 56 societies holding a total of 309 meetings, with an attendance of 63,348 as contrasted with 60 societies holding 253 meetings with an attendance of 42,324 during 1912.

LIBRARY

During the year 1913 there was added to the Library of the three Founder Societies and United Engineering Society 3566 volumes and pamphlets, of which 762 volumes and pamphlets were purchased at a cost of $2,078.04. The total number of books and pamphlets in the Library at the end of the year is 54,245.

The attendance during the year was 11,091 as compared with 10,522 during 1912, an increase of 569 for the year 1913.

The Department of Research Work has continued its activity during the past year. In answer to requests received from correspondents in Patagonia, Korea, Japan, Australia, Mexico, South Africa, the Congo Free State, Alaska, Canada, and England, as well as from different parts of the United States, 168 searches have been made on a great variety of subjects. These searches have included the making of several hundred photographic reproductions. More than a thousand reference questions have been answered at the desk.

The Library receives more than 800 technical periodicals which are available through indexes for research purposes.

Respectfully submitted,

(*Signed*) Jos. Struthers, *Treas.*

UNITED ENGINEERING SOCIETY

Balance Sheet, January 1, 1914.

ASSETS

Real Estate, Land		$540,000.00
Real Estate, Building		1,050,000.00
Real Estate, Equipment		27.357.16
Furniture and Fixtures		5,795.46
New York City Bonds, 4½% 1917	Depreciation Fund.	5,231.25
New York City Bonds, 4¼% 1930-60		5,062.50
New York City Bonds, 4¼% 1962		4,943.75
Baltimore & Ohio Bonds		5,037.50
Delaware & Hudson Company Bonds, 4% 1943		4,933.75
Southern Railway Bonds, 4% 1956		4,755.00
Library Books, U.E.S.		329.07
Library Adjustment Account		46.75
Accounts Receivable		4,564.18
Unexpired Insurance		960.83
Cash:		
Working Balance	$16,446.20	
For Contingency, Depreciation	10,000.00	
Ways and Means Committee	1,165.08	
		27,611 28
Petty Cash		500.00
Interest Receivable		680.00
		$1,687,808.48

LIABILITIES

Balance of Land Mortgage, A.I.E.E.	$54,000.00	
Balance of Land Mortgage, A.I.M.E.	34,000.00	
		$88,000.00
A.I.E.E. Equity in Building		350,000.00
A.S.M.E. Equity in Building		350,000.00
A.I.M.E. Equity in Building		350,000.00
A.I.E.E. Equity in Real Estate Equipment		3,346.61
A.S.M.E. Equity in Real Estate Equipment		3,346.62
A.I.M.E. Equity in Real Estate Equipment		3,346.62
A.I.E.E. Payments to date in liquidation of mortgage on land		126,000.00
A.S.M.E. Payments to date in liquidation of mortgage on land		180,000.00
A.I.M.E. Payments to date in liquidation of mortgage on land		146,000.00